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THE JOURNAL OF PHILOSOPHY

THE MATERIAL WORLD—SNARK OR BOOJUM?[1]

THE alternatives suggested by this title are real and vital. Let me recall the solemn warning of the Baker's uncle in Lewis Carroll's masterpiece:

> If your Snark be a Snark, that is right:
> Fetch it home by all means—you may serve it with greens,
> And it's handy for striking a light.
> * * * * * * * * *
> But oh, beamish nephew, beware of the day,
> If your Snark be a Boojum! For then
> You will softly and suddenly vanish away,
> And never be met with again.

The consequent trepidation of the Baker in participating in the hunting of the Snark is much like that of the philosopher in tracking matter to its lair. He hopes that his toils may capture something philosophically palatable or at least capable of illuminating the darkness of metaphysical ignorance. If the quarry turns out to be a Boojum, however, the philosopher himself, as a nucleus of hopes, aspirations, and ideals, as a personality palpitating with spiritual yearnings, will softly and suddenly vanish away, perhaps into an attempered dance of atoms. Hence he too begins the hunt with soul oppressed and heart

> . . . Like nothing so much as a bowl
> Brimming over with quivering curds.

The notion of vanishing away is one he can endure no better than can Lewis Carroll's hero.

Early Greek philosophy turned friendly eyes toward the world of matter, but Plato is quick to take alarm and exorcise this μὴ ὄν as unperceivable, without form, and void of self-respecting qualities. The Aristotelian restoration as δυνάμει ὄν is but damning with faint praise. The descent is rapid to the νεκρόν and κακόν of Philo, to which Plotinus adds Plato's μὴ ὄν as a final quietus. Duns Scotus can find for it no better characterization than "*Subjectum generationis et corruptionis*" and even Galilei's revival of scientific atomism does not long soften the philosophic heart. Matter quickly resolves

[1] Annual address delivered at the first meeting of the Pacific Division of the American Philosophical Association, Berkeley, California, November 28, 1924.

into a Berkeleian non-being or a Humean fiction and enters its latest phase in philosophic history humbly, a mere Kantian category of the phenomenal world.

It must be admitted, however, that the materialism of the eighteenth century discovered not a Snark but a Boojum, and perhaps philosophers are hardly to be blamed, in the light of that experience, for trying to play safe. Nevertheless, for us the situation is tantalizing to say the least. Philosophy must somehow adjust itself to science. Why must matter be a mere phenomenon just when science is finding it so extremely complex and interesting? What if the philosopher could link up this new knowledge with his own analyses and aspirations? Perhaps he has been misled by conceptions of matter now obsolete, and perhaps the new material universe may be a real Snark. To discover this would be joyous. I believe a new adventure in materialism is timely and worthy of trial, although the menace of the Boojum is ever before my mind.

Mr. Whitehead (*Concept of Nature,* p. 16) says that "The history of the doctrine of matter has as yet to be written." "Plato and Aristotle found Greek thought preoccupied with the quest for a simple substance in terms of which the course of events could be expressed. We may formulate this state of mind in the question, What is nature made of? The answers which their genius gave to this question, and more particularly the concepts which underlay the terms in which they framed their answers, have determined the unquestioned presuppositions as to time, space, and matter which have reigned in science" (p. 19).

"The succession of ideas starting from the crude guesses of the early Ionian thinkers and ending in the nineteenth-century ether reminds us that the scientific doctrine of matter is really a hybrid through which philosophy passed on its way to the refined Aristotelian concept of substance and to which science returned as it reacted against philosophic abstractions. . . . But substance represents the final philosophic concept of the substratum which underlies any attribute. Matter (in the scientific sense) is already in space and time. Thus matter represents the refusal to think away spacial and temporal characteristics and to arrive at the bare conception of and individual entity. It is this refusal which has caused the muddle of importing the mere procedure of thought into the fact of nature. The entity bared of all characteristics, except those of space and time, has acquired a physical status as the ultimate texture of nature; so that the course of nature is conceived as being merely the fortunes of matter in its adventure through space " (p. 20).

I quote at length from Mr. Whitehead's *Concept of Nature,* for

I know no more succinct statement of the historical aspect of our problem. He has done us a great service in freeing the concept of matter from the entanglements indicated. I do not believe, however, that he is as emancipated from the influence of certain other no less pernicious traditions as he himself believes. As I find it impossible to discuss matter without touching upon the concept of nature, perhaps you will pardon me if I digress for a moment to this concept and incidentally try to make clear my divergence from Mr. Whitehead, to whom, nevertheless, I am more indebted than to any other philosopher of nature.

Mr. Whitehead defines nature as "that which we observe in perception through the senses." If he really means this, all sciences, even the social sciences, become natural sciences and nature becomes co-extensive with the beginnings of all knowledge. We surely "observe in perception through the senses" not only mountains and streams, but also such things as beauty, a toothache, or a fine character, and if we accept the James-Lange theory of the emotions, even in its modified forms, emotions are also a part of this world of nature. The objection might be raised that such objects as beauty or a fine character require an evaluating activity of thought, but this would hardly defend Mr. Whitehead, for he admits that "it is a difficult psychological question whether sense perceptions involve thought." It is certainly true that "sense perception has in it an element which is not thought," but so have beauty, character, and emotion. In any case, although this residuum might be adequate to give us the bare datum of a world of nature, it does not give us the nature that science constantly leads us to assert as existent, or that Mr. Whitehead is interested in analyzing. We must seek further for a definition of the physical world.

I am as interested as Mr. Whitehead in avoiding a "Bifurcation of nature" into "the nature apprehended in awareness and the nature which is the cause of awareness" (p. 31). But this definition of nature prejudices escape. To loose this Gordian knot it must be maintained that there is nothing but a survival of theological metaphysics in justification of the degradation of nature to a mere *res extensa* as over against the spiritual or thinking man as a *res cogitans*. We must accept the extension of the concept of nature as implied in my comments on Mr. Whitehead's definition. Beauty, character, and thought itself, together with its products, must be viewed as part of nature. It is as possible to study a process of thought naturalistically as it is to study a process of erosion, and as possible to give a naturalistic account of the development of a concept, as of the growth of a tree. But also, just as it is possible for the geologist,

in his study of erosion, to abstract from the electronic and atomic properties that are constituents determining the character of his data, so it is possible to be interested in the character of any natural event in abstraction from the psychological processes involved in being interested in or in knowing it. This is in agreement with Mr. Whitehead's conception of nature as being self-contained for thought, that is, something that "can be thought of as a closed system whose mutual relations do not require the expression of the fact that they are thought about," but for me thought itself would lie in this system, for it is surely possible to think about thought in this same fashion.

In popular usage the concept of nature refers primarily to the subject-matter of the physical sciences and this is the way it is apparently understood by Mr. Whitehead. In scientific thinking the extension to the biological sciences has nearly won its way, although some few may still make reservations as to the nature of life. The extension to the psychological sciences is becoming accepted, but the social sciences are still without the pale. I think this is a mistake, but I do not care, at this point, to digress and give such an extension of the term the justification I believe it deserves. The present problem merely demands a few words as to the differentia of the various types of sciences.

Science begins whenever someone becomes interested in any facts and attempts to give a description of them in general terms. It becomes technical only by degrees. There is sound psychological insight in the remark of Professor W. S. Franklin, quoted in James' *Pragmatism* (p. 49): "I think that the sickliest notion of physics, even if a student gets it, is that it is 'the science of masses, molecules, and the ether.' And I think that the healthiest notion, even if a student does not wholly get it, is that 'physics is the science of the ways of taking hold of bodies and pushing them!'" At least this statement corresponds to the actual origin of physics. Similarly, we might say of the biological sciences that they appeared when somebody became interested in watching plants and animals grow and propagate; and chemistry, when human curiosity turned toward the consequence of mixing things together under different conditions.

Hence, the beginnings of scientific knowledge are spotty. In working out the problems that arise from any line of observation certain hypotheses have been suggested and verified, and certain concepts established. These constitute the practical differentia of the sciences. For example, space, time, matter, mass, and energy have come to be the dominating concepts of physics as the concepts

of atoms, affinity, and valency dominate chemistry; the cell, biology; and sensation, perception, feeling, and the like dominate psychology.

When such concepts have been established they tend to be looked upon as the private property of the science within which they were generated. When they find new applications, the field of that science is extended. Thus the concept of the electron has enabled physicists to shed light on many problems, such as the operations of affinities and valencies, that had been previously looked upon as purely chemical. Hence physics invades the field of chemistry. Similarly, chemistry has entered biology through the recognition of the value of its concepts and methods in that field. If these sciences still hold aloof from psychology and sociology, it is because at present we see no useful application of their concepts in these fields, although with the study of the ductless glands, chemistry is threatening to invade the field of the psychologist, and the study of man's dependence on his environment is opening the door to the social sciences.

The physical world, then, is nothing but that aspect of reality which the concepts developed in the physical sciences interpret successfully. The concept of matter is most fundamental and there has been a somewhat premature attempt on the part of some scientists and philosophers to make this concept the fundamental concept of all science with the result of awakening the counter tendency to disparage the concept utterly. One interested in a restatement of materialism must ask (1) what is actually meant to-day by the concept of matter, (2) what conditions limit or qualify the extension of it to other sciences, and (3) whether these limitations and qualifications justify the popular disparagement of it by philosophers.

Scientific concepts undergo a modification through usage. For present purposes we must get rid of the accumulated tradition that obscures our vision of the significance of the idea of matter. Up to the beginning of the present century modern physicists have generally thought in terms of an empty vessel, space, a smooth flowing time, and unchanging, imperishable material atoms that move from place to place in definite units of time. The weakness of these concepts has gradually become manifest as science has recognized more clearly that its problem is that of forming general but empirically verifiable descriptions. Even geometrical space means nothing to physics except in so far as it can furnish diagrams illustrative of the shape, size, or motion of things. Geometrical theorems require verification before they, or the concepts involved in them, can be called true in the sense of throwing light on the world we live in—not, of course, as following by accepted principles of deduction from the assumption on which they are based.

Recent popular introductions to the relativity theory have made these and similar difficulties familiar. Euclidean geometry stands or falls with its concept of the straight line. This must be identified empirically with the path of a ray of light. But since light gravitates these paths are not the same in any two parts of empirical space, and that space is not homologous. Of course, the Euclidean ideal can still be held, but if it is, empirical space must be thought of as coextensive with a dynamic field and every verifiable geometric measurement must be supplemented by a mechanical computation, for the geometry alone solves no empirical problem. To retain it is like retaining Ptolemaic astronomy and introducing epicycles *ad libitum*. Fortunately, we can neglect these complications for every-day tasks, just as we can look upon the sun as rising in the East and setting in the West, or as we can neglect the problems of the earth's curvature when surveying the potato patch or building a house. But such neglect is not justified when we are interested in the actual nature of physical reality.

Similarly, the smooth flowing of time means nothing unless there is some discoverable uniform motion by which it can be represented, but such motion nowhere appears. We can not even give an absolute meaning to the concept of simultaneity as referring to the occurrence of several events in different parts of space. Time, like space, becomes only an aspect concept, that is, a concept serving to describe certain characteristics of changing reality as space describes certain other features of them. Also no determination of either aspect is possible without reference to determinations of the other. Hence the new space-time concept, the four-dimensional world scheme of the relativists.

Is matter any more independent? Certainly there is no situation where the concept of matter is applicable in which the concepts of space and time are not also involved. I am fearful of getting beyond my depths in the intricacies of modern physics, but the situation seems to be this: in the business of living the classification of solids, liquids, and gasses early justified itself; through the labors of chemists the concept of the molecule and atom came to characterize elements manifested in the structure and behavior of these: recently, the atom has been resolved into electrons and nuclei, and the joint labors of physicists and chemists are making manifest its involved structure. But in this last stage of development something new has taken place. Where the atom, as the unit of matter, had been conceived as a minute solid chunk of elemental substance, like a tiny pebble, the electron has no such character. It need not even be thought of as continuously existing. Kramers and Holst say:

"During the transition from one stationary state to another we have no knowledge at all of the existence of the electron, indeed we do not know whether it exists at that time or whether it perhaps is dissolved in the ether to be reformed in a new stationary state" (*The Atom and the Bohr Theory of its Structure,* p. 133–4). Whatever the outcome of the evidence may be, even this speculation is revolutionary as to the concept of matter, for it deprives matter of its eternal existence, an essential attribute under the older conception.

Now in place of the solid atom, we have a nucleus composed of electrons and protons that may under certain circumstances be detached from it, and surrounding this, definite numbers of electrons also detachable under proper conditions. These are immersed in a sort of dynamic field of which the substantive aspect is called ether. This ether, for Einstein, is indistinguishable from physical space, and the elements may or may not be permanent existences in it. The next problem of the analysis of matter may lead to a disintegration of electrons and protons—or it may not. The problem of the analysis of ether has become the same as that of the empirical analysis of space.

The electron and proton are described as unit charges of positive and negative electricity respectively, but this gives them a somewhat unique status as physical entities for electricity is fundamentally an energy concept. Energy is technically defined as "capacity to do work." Its occurrence implies that the character of reality is such that change does not take place erratically. Under certain conditions specific changes occur and there is a certain equivalence between factors in the conditions such that a system of correspondence units is possible. Thus a weight may balance another and keep it from falling, or it may compress gas and, since this means an increase in the movements of its molecules, give a heat equivalent, or it may turn a dynamo and give rise to a certain amount of electric current. Energy is merely a name for equivalence of such dynamic conditions in correlation with consequential changes. When we say the electron is a unit of negative electricity, we continue and explain: that it has mass means that certain changes correlated with its presence are, under given conditions, equivalent to a definite fraction of those produced by a gram weight; that it has magnitude means that the region of space with which the mass effect is associated is extended; that it moves, means that the region where the mass effect originates is not always in the same spacial relation to other definable regions.

We can neglect the detailed description of these characteristics. What is left of matter is this: if we examine the space-ether we find

(1) a field of radiant energy, that is, a condition such that certain predictable, or at least theoretically predictable effects, like heat and light, occur in it at every point under proper conditions. But (2) certain minute regions of the field present an apparent discreteness. They are starting points with which radiant conditions can be correlated as moving outward from them. These regions have definite habits of behavior such as attraction, the habit of moving closer to, or repulsion, the habit of moving farther from, each other. Or they may combine in definite and analyzable fashions.

The distinction between the ether and these regions seems to be that as we pass from one region to an adjacent region in ether there is an approximate continuity in the change of the occurrent dynamic state, whereas, if we pass from the ether to an electron or proton, there is a rapid, if not discrete, change in the dynamic condition of the region involved. Whereas there is no reason for taking any specific extent of ether to correlate with the dynamic state found in other regions, the regions known as electrons and protons require such extent limitations. Also, since the extents these latter occupy can be said to move with respect to each other, it is further possible to correlate the rate of such motion with their dynamic effects, *viz.*, the mass of an electron varies with its velocity and approaches infinity as its velocity approaches the speed of light. The dynamic states of the rest of the ether, having no limited regional extensions, can not be so correlated, hence this portion of the ether constitutes a single continuous entity.

If the concept of space is made identical with that of the ether, space becomes equivalent to the manifestation of the energy conditions of the universe. The electron and proton are certain critical regions of space. It becomes an arbitrary choice whether we should apply the word "matter" to the ether also, but it is more in accordance with general usage to limit it to electrons and protons together with the structures resulting from the integrations to which they give rise. From this point of view, nature, or the physical universe, can be defined as that aspect of reality that exhibits the energy character of the space-time continuum through the character of limited regions. The concept of matter merely notes the fact that there exist certain critical regions from the behavior of which with respect to each other and the surrounding space-time in which they lie general ether conditions can be deduced. Matter is the name for a type of structure.[2]

Up to this point we have surely found nothing in the material world to make it a Boojum for philosophers. The crucial moment,

[2] Cf. this JOURNAL, Vol. XIV, pp. 680–688. F. J. E. Woodbridge: "Structure."

of course, comes when it is a question of extending physical analyses and concepts to the biological and psychological sciences. We must now ask under what conditions such extension is possible, for the rudimentary processes of space-time give rise to the science of mechanics and the Boojum is a mechanics that engulfs all reality.

Perhaps we can best attack our problem by asking what we mean when we call an atom an entity and assign to it magnitude, motion, and qualities. The atom, you will recall, consists of a nucleus composed of protons and electrons, and certain more or less definitely ordered surrounding electrons. Any of these electrons and even some of the protons may get knocked out of it and may not be replaced with no further consequences than possibly changing its kind as a chemical element. By the magnitude and shape of the atom we refer to the extent character of the space occupied by such a system. In ascribing motion to it, we point out that the characteristic space-time relations of its components may be retained while other relations existing between it and similar systems vary. When we speak of its qualities, we refer perhaps to color and other radiant characteristics that are correlated with the movements of its constituents. Its affinities and valencies refer to its tendencies to unite with one or more such atom systems and are a function of the number and arrangement of the surrounding electrons. We call it self-identical in spite of losses or additions of electrons that do nothing more than, perhaps, vary its valencies, although if protons or nucleal electrons are lost, the character may be so radically changed that we count the result as a different element as in the case of radio-active transmutation.

The atom still falls under our definition of matter, for it is as a whole a critical structure of space-time. We can still deduce from it certain behavior of other critical regions of space-time (other atoms) when sufficiently close to it. But we have also attained a first degree of real abstraction, for the character of the atom as a whole has no correlation with the character of the surrounding space-time that is neither electronic nor atomic in structure. These characteristics, light waves, for example, are correlated only with the behavior of its electronic constituents, but quite independently of the fact that they are its constituents. That is, the waves would be the same if the proper electron was moving as it is moving whether it were a part of the integrated system of an atom or not. But the integrated atom is nevertheless a whole in that it constitutes a region of space-time having properties that, although consequences of the properties of the elements from which it is integrated, are not identical with any of them. The first occurrence of any such whole in nature is the creation of a genuine novelty.

Since the sociable character of atoms, except in the case of a few inert gases, leads them to go about linked together as molecules, the molecule constitutes another space-time region next in point of complexity and magnitude. The analysis of a molecule may turn in either of two directions: we may investigate the correlation of the characteristics of its constituent atoms with those of the molecule as a whole, or we may study the behavior of the whole molecule with respect to other molecules. This latter study leads us to aggregated states of matter, the gas, liquid, and solid where the two points of view may be paralleled. Since the results are adequately describable in terms of positional change, that is, relative motion, rigidity, elasticity, flow, and the like, their analogy with the basic terms of our space-time description is so great that, apart from the historic fact that they constituted the original objects of the study which resulted in modern physics and chemistry, we have no hesitation in asserting that we are still studying the material universe.

Among the many integrations of molecules there appear certain ones of a peculiar character that tend to shift the direction of interest and seem to many to lead us away from the merely material world. Some among molecular systems involve peculiar molecular affinities and valencies, interactions of atomic groups with one molecule with atomic groups within other molecules, and that result in very peculiar dynamic states of matter. I refer to crystalloids and colloids. There is a chemistry and physics of these substances, although as yet very inadequately developed, that tends to link their properties to the properties of their molecules and so to physical nature, but the complexities of their behavior as wholes is such that there has also been a tendency to see in certain of them at least something alien to mere physical nature. As constituents of living organisms they seem to many to be set apart by a mysterious property called life. When complex material structures begin to grow, to assimilate, to excrete, to reproduce their kind, and to move without complete dependence upon the momentary character of their environment, the gross effect is too striking to be ignored, although a parallel to each of these processes may be found in what is clearly inorganic, non-living nature. Also the feeling of discreteness is strengthened by the fact that biology, as a science of living organisms, has already appropriated as its field the structures in which these colloids are chiefly occurrent.

The situation is further complicated by the fact that the living colloids usually occur only as parts of more complicated structures, as atoms are usually parts of molecules. The cell, unicellular organism, multicellular organism, and multi-organism—an integration

of multi-cellular organisms—appear in succession. Each exhibits its own peculiar multiplicity of functions and energies. In the course of this integrative ascent the breach with the physicist's world seems to widen rapidly. In his world scientific description is possible in terms of a few sorts of energies and positional changes. For the concrete character of light, for example, either vibrations of specified rate, length, and shape can be substituted. The properties of biological entities, however, become so complex and their variety so great that it is no longer possible to define simply the multiplicity of types of energy displayed, and the quantitative description of changes tends to fall in importance below that of their kinds. Of course, I do not mean that quantitative studies have no meaning for the biological, psychological, and social sciences, but they get a different status in them, since even a comparatively familiar process like growth can not be as adequately described mathematically as the passage of a beam of light through media of varying densities, and the quantitative description of the disintegration of a radioactive atom is much more illuminating than any quantitative description now possible of the death of a rabbit.

To test out the significance of the materialistic hypothesis for philosophy, let us assume, as scientists are mostly coming to do, that the distinction between organic and inorganic matter is merely one of complexity and kind, that life is the name for a delicately organized dynamic balance in complex molecular structures. No property that life actually has is in any way modified by the assumption. Two problems are indicated: first, the careful description of the changes that living things actually exhibit and the classification of these changes as general laws of living substances; secondly, the analysis of these changes to discover the exact cellular, chemical, and physical processes with which they can be correlated as consequences. This second problem links life to the world of the physicist and chemist; the first exhibits the character of that world in a new state of complex organization. From the form of the analysis, the biological objects should still be called material.

The critical point for philosophers is the transition from the physical organism to the mind. If this problem is approached in a scientific and empirical attitude, freed from historical preconceptions, it exactly parallels the point of transition between inanimate and animate matter. The situation is confused because of a certain ambiguity that has crept into the current use of the word "mind" in psychological discussion. Behavioristic psychology, interested in the description of functioning, has tended to limit the term to *mere* functioning and to overlook the analysis of the entities through

which the functioning takes place. Introspective psychology has, on the other hand, restricted itself too closely to describing these entities, neglecting both their functional aspects and the conditions through which they are generated. Physiological psychology confines itself to these conditions and forgets the entities to which they give rise. All have their points of insight, but it requires a philosophic synthesis to put them in their proper perspective.

At some point in the development of organisms there appear certain integrations of special cellular structures within them that initiate a new order of entities in exactly the same sense that an integration of electrons and protons gives rise to an atom. These new entities have qualitative characteristics and typical modes of behavior just as truly as the integrated aggregate of molecules that constitutes a rock or a cell. They are the entities the character and relations of which introspective psychology has undertaken to describe. As the atom rarely appears except as an integrated part of a molecule, so these entities appear in a more complex whole that we call mind. The mind can be described as a whole in relation to other minds, or its character can be analyzed as a consequence of the characters of its components. These components can be viewed in turn as the characters of integrated cellular structures as wholes. Note that in this analysis no verifiable aspect of mind is lost or belittled. The properties and qualities of mind are not explained away any more than the qualities of water, and the properties of it studied by hydraulics are belittled or explained away when water is conceived as an integrated molecular structure and its properties a consequence of this structure. It is asserted, however, that if the structure and organization of its components are changed its character as a whole will be changed. This is empirically verifiable. It is the justification of the stress laid on the learning process and, with respect to ideas, on the character of the nervous system or of the endocrine glands, as affecting states of mind.

This conception of the relation of the mind and the body is congruent to, although perhaps not identical with, that suggested by Professor Watson some years ago in a very illuminating article in this JOURNAL entitled "The Concept of Mental Disease." His point is briefly this: we assume disease where any bodily functions are disturbed so that they seriously hinder the normal actions of the integrated structure of which they are elements. The notion is extended to mind when its conscious elements, such as memories, emotions, or ideas are changed to disturb the expected integrative functioning of the whole. Such disturbances are of two types. Certain of them are due to the formation of what are popularly

called bad mental habits and repressed impulses, that is, certain unfortunate synapses of the nervous system. The methods of re-education, psycho-analysis, and suggestion, may have more or less corrective efficiency in these cases. We call such methods *mental* treatments for they utilize only the ordinary means of *mental* communication. What actually happens is that certain stimuli to sense organs, the eye and ear, for example, excite nerve paths that result in a changed organization of synapses. Other cases of mental disease are due to serious structural changes in the organism, such as nerve or glandular deterioration, that can only be corrected, if at all, by strictly physical treatment, the use of drugs or surgery. Hence they constitute another category of *mental* disease.

In addition to the explanatory advantages of the extension of the forms of analysis characteristic of the physical world to the realm of mind and the concrete problems the hypothesis suggests, there are certain advantages that are of specific value to the special problems of the philosopher. In the first place, if his reflections are to be of any significance, it is necessary to assume that ideas are effective elements in the determination of conduct and are modified by the processes of experience. Psychological dualisms have to meet this need by such perfectly unverifiable hypotheses as the parallelistic and interactionistic. Interaction has the real merit of assuming that ideas are effective in determining conduct, although the manner of the determination is absolutely inexplicable. It has the disadvantage of producing that "bifurcation of reality" that Mr. Whitehead so vigorously protests. In addition it raises the epistemological problem in such a form that it can receive only dialectic answers and is likely to result in such conclusions as appear in the subjective and solipsistic interpretation of Berkeley.

The parallelistic theory is also open to this objection, and in addition it shares the epiphenomenalistic difficulties of the double aspect theory. If mind is merely an aspect of nervous processes, or something flowing parallel to these processes, it is no more effective in determining the behavior of an organism than is the paint on an automobile in directing the efficiencies of its engine. It is a pseudo-salvation of the dignity of mind, but a real salvation, that might justify the significance of ethical, esthetic, and religious attitudes, is sadly lacking. In contrast let me review briefly the main points of my restatement of the materialistic hypothesis as relevant to these points.

Materialism aims to interpret the processes of life and mind as manifestations of the fundamental processes of physical nature. While these processes were conceived as an interplay of solid, im-

perishable atoms, this meant an extension of the principles of mechanics to all reality. As justifying Laplace's assumption that the history of the universe could be reduced to a differential equation, it was foredoomed to failure for the sciences of life and mind, and especially for philosophy, inasmuch as philosophy is concerned with attitudes of evaluation. But in the light of modern science the fundamental processes of nature must be reconceived. The discovery of electrons and protons, with the study of their properties, is not a mere pushing back one step to new imperishable elements and new external forces. It is the substitution for such atoms and forces of a dynamic conception of certain critical regions in space-time reality. It introduces a new mechanics and makes clear that any mechanics is nothing but a description of the behavior of types of entities that happen to be simple enough so that their motions can be adequately indicated by mathematical formulas. There can be many types of mechanics, all equally truthful and real.

The conception of the physical object has also a new meaning, for, unless it be the electron or proton, and of these it would be premature to express a decisive opinion, there are no more absolutely solid objects, in the sense that atoms have been conceived as such, but only structural regions functioning as wholes, but analyzable into interrelated lesser critical regions. The physical object has lost its attributes of spacial continuity and indestructibility. In this sense the living object, or even a mind or a society, is as much a physical object as an atom.

The thesis is becoming clarified that reality must be analyzed into levels of entities such that the properties of the entities on any level can be conceived as consequences of the properties on a lower level, and conditions of the occurrence of properties on a higher level, in the sense that if any entities change their constituents must have changed, and their consequences be different. This is close to the Aristotelian world scheme of nature, but metaphysically it substitutes the empirically describable field of space-time for primary matter or pure potentiality. Also it omits the teleology of the pure form as a final cause and sees in the world processes an orderly and progressive manifestation of the implicit character of the space-time dynamic field. It is the unfolding of a character rather than the realization of an *a priori* plan.

It should be emphasized that in this system of levels each integrated entity acts as a novelty in its behavior as a whole as compared with the behavior of its constituents. It is this fact that removes the sting inherent in historical materialisms, and assures us that this new materialism may be a Snark and not a Boojum. To

explain: the laws describing the characteristic behavior on each new level of integration are not merely novelties with respect to those of lower levels. Although consequences of them, they transcend them in a very definite way. For example, while the path of an electron is determined by certain relations to other electrons and the space-time field in terms of its own level, if that electron happens to belong to an atom of a molecule of flowing water, its actual world line, *i.e.*, its path in space-time, is dominated by the conditions of fluid behavior expressing hydraulic laws. Or again, while gravitation may describe the behavior of masses as such, the motion of the mass of a Jack rabbit's body while fleeing from a dog is at least as much determined by chemical changes within the animal's body as by gravitation, and these in turn are greatly modified by the act of seeing and perhaps ideas that sight has evoked.

In general, when any integrated whole reacts with another, the related processes in its constituents have to conform themselves to demands put upon them by the whole. This is particularly important for a materialistic philosophy, for it means that, even although man is conceived as an actual part of the cosmos, a physical object amongst other physical objects, nevertheless his behavior is not reducible to mere chemical and physical laws, however it may be conditioned by such laws. Thus if an idea be conceived as an integrated set of organic structures with their consequent qualities, as an atom is such a set of electrons, the reaction of idea with idea or of idea with the rest of the organism to produce a certain action, is a transcendent process with respect to its constituent cellular and chemical processes, in just the same sense that the flowing of a liquid is transcendent with respect to the movements of the electrons that constitute its atoms. The character of the components sets certain limits to possible effects, as gravitation limits the leap of the Jack rabbit. Nevertheless, when an action between wholes has been initiated the processes on lower levels have to adapt themselves to the new pressures that are put upon them in so far as their character permits. The word "fire" as a stimulus to an organism that has acquired the requisite background of ideas sets in motion a most complex group of chemical and physical processes within the organism, but the response itself is something that, as a whole, is neither physical nor chemical, although its character is modified by the limitations such processes impose. Also the full explanation of the occurrence of these processes will be unintelligible without reference to that structural whole which is the idea. This may be the basis of the hold that teleology has on the biological sciences.

If this position is accepted as a background for philosophy, it

is easy to see that the philosophy of physical sciences can not begin with, or make use of, psychology and epistemology in solving its problems. It must hold that psychological entities and processes are simply occurrences in nature having highly complex structures. Psychology as a science must analyze and describe them, just as the biologist and the physicist must analyze and describe the entities and processes to which they direct their attention. Such a psychology will be interested in endocrine glands or neurones in just the same way that the biologist is interested in physics and chemistry, but it will be interested in conscious processes as the biologist is interested in the relations and behavior of organisms. The philosophy of the physical sciences will only be interested in the meaning and significance of scientific ideas, or in the steps by which they have been attained historically. The psychological and physiological processes involved are hardly relevant.

The philosopher finds certain sets of ideas related to behavior and its consequences in a special way that leads him to group them together as knowledge. They function by restraining impulsive tendencies to act, by anticipating consequences of action, and by redirecting impulse to attain or avoid the anticipated consequences in accordance with certain feeling states that appear with them. It is a psychological problem to record the history of the experiences that have led to these ideas becoming what they are and their relations to other ideas, or the sort of behavior to which they lead. It is another sort of problem when we ask what we mean by calling them knowledge. Then we no longer think of them as terminal results of natural processes due partly to the character of the organism and partly to environments it has experienced. We concentrate wholly on their functioning as leading to or away from the realization of anticipated consequences. In the former case we call them true, in the latter false. The idea of the truth or falsity of an idea is the idea of the success or failure of that idea in producing results that agree with the expectations it has engendered. Thus the natural process of the quest for truth may be initiated by the idea of truth. The results of trying out tests of truth have given us logic, and objective reality becomes that with respect to which ideas can function as true or false.

Our materialism is also adequate as a basis for esthetics, ethics, and a philosophy of religion. If esthetics is concerned with emotional communication, there is in it a clear justification of psychological esthetics as concerned with the problems of how far elements like line, form, color, tone, and rhythm can determine a precise emotional effect and, if desired, relate it to specific ideas. It is also

suited to exhibit the grounds for asserting that esthetic experience has definite values and a claim to greater consideration in life, for it alone can clearly conceive the relations of emotion and conduct. Also it avoids the sentimental definitions of beauty that repel most clear thinkers, for it sees beauty clearly as an integration of those characteristics of objects that are capable of determining certain emotional effects in an observer.

For ethics it preserves the essential character of free will, in the sense of action directly controlled by ideas, and suggests such processes of rational valuation as constitute the essential theses of Westermarck's great book.

That a religious philosophy can be derived from materialism is perhaps a little less familiar. Whatever religion may have been in its beginnings, magic or spiritism, the religions of civilized peoples are outgrowing such conceptions, as morals are outgrowing uncriticized custom and tradition. Developed religions all undertake to exhibit man's relation to some larger whole, whether humanity, the cosmos, or a Kingdom of Heaven, in such fashion that incentive may be given to aspiration and striving towards what are commonly called the higher things of life. This our materialism is admirably suited to do. In placing man definitely within the cosmos, but in recognizing the novel character of each integrated whole that reality has produced, it gives him a unique function to fulfill with reference to reality and consequently a unique significance. For since in man alone the capacity for the control of action by ideas has its fullest realization, in exercising that capacity to its uttermost, man is fulfilling his cosmic or divine mission. The virtue of holiness is the divine virtue of intelligence. "Each thing is at its best when it is most fully realizing its own nature." What is morality or even ideal aspiration but the fullest utilization of the capacity to control action by ideas? If we are mystically inclined, we may believe that it is not wholly a matter of human concern that man should submit to this destiny. If there is one feature of reality that scientific materialism throws into relief, it is that what *can be* produced *must be* whether it survive or not. It matters not if the life of humanity is merely episodic in the history of the cosmos, for it remains factual that only through humanity can certain aspects of the nature of reality find expression. In religious symbols we call this real nature God, hence it is only through man that the full will of God can be realized. Without man and without the episode of human life "God and the universe can not prosper."

I must ask your forbearance for the extreme brevity of these last paragraphs. You see I am profoundly convinced that the re-

proaches that have been justly directed toward ethical and atheistic materialisms have been due to a mistake in the formulation of the doctrine, a mistake fostered by scientific conceptions more immature than those accessible to us. I could not refrain from suggesting, although merely suggesting, a possible line of reply to F. A. Lange's comment that "Materialism lacks relations to the highest functions of the free human spirit," that "it is, apart from its theoretical inadequacy, unstimulating, barren for science and art, indifferent or inclined to egoism in the relations of man to man. It can hardly close the circle of its system without borrowing from Idealism." None of these things I believe to be true. Yet the point of view advocated is a genuine materialism: It asserts the continuity of the processes of life and mind with those of physical matter and grants that the same method of analysis is everywhere valid, however its end products may differ through varied characters arising at different levels of cosmic integration. It is not a sublimated idealism for it does not read the distinctive character of mind back into lower levels of integration or make mind the model of the cosmos.

Let us now return to the classic masterpiece from which this discussion started. The shouting, hand-waving, and head-wagging are over. The hunt has come to an end and I have taken my plunge into the chasm dwelling of materialistic philosophy. Remember the Baker's companions "as they waited and listened in awe":

> It's a Snark! was the sound that first came to their ears,
> And seemed almost too good to be true.
> Then followed a torrent of laughter and cheers;
> Then the ominous words "it's a Boo—"
> Then, silence. Some fancied they heard in the air
> A weary and wandering sigh
> That sounded like "jum!" but the others declare
> It was only a breeze that went by.

The ending of my tale, is, I hope, different from Lewis Carroll's. I believe that if you will search carefully you will find me happy and at peace with a Snark and come to laugh at the ominous sigh as but the product of a passing breeze.

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BOOK REVIEWS

The Field of Psychology; a Survey of Experience, Individual, Social and Genetic. MADISON BENTLEY. New York: D. Appleton & Co. 1924. Pp. xvi + 545.

The experiences and performances of the organism-as-a-whole (the psychosome) are the subject-matter of psychology. Experience

(sensation, sensimage, and feeling) is regarded as the mental aspect of the organism, and performance is considered as a union of mental and bodily factors. Performances are classified as psychosomatic functions and include perception, attention, association, memory, volition, emotion, and thought.

After a more or less conventional introduction and under the heading, "products of analysis," the author discusses mental processes—sensation, sensimage, and feeling—as convenient descriptive terms, thus avoiding the problem of elements. The first two represent one aspect of experience—items—and the third is a sort of shading or coloring, akin to the "haze upon the distant mountain" (49) giving to experience warmth and value. We can not analyse feelings. We can merely separate the pattern or configural side of experience from the indicatory side.

The reviewer finds himself dissenting from this opinion on feeling for it implies, as stated, that feeling constitutes the core of experience rather than the shell, while sensation and image constitute the "sizing." Feeling has always been troublesome to the systematizer, presumably for the reason that it does not belong to descriptive psychology at all since it can not be described or analyzed! Rather, it belongs to the esthetics of experience. It would seem that if feeling stands up under observation, even to the extent of being recognized, it must be an "item" as much as any other form of mental process; and most likely, if it is such an item, it is organic and kinesthetic sensation, or else an out and out interpretation. We venture the suggestion that the belief in the unanalyzability of feeling may be traced to the fact that, like any process, it is destroyed in the analysis, but since it is so difficult to reinstate immediately, compared with perception, we are led to the erroneous conclusion that it is lacking in clearness.

Under constituents of experience the author next presents the subject of sensory qualities. Fifteen pages are devoted to visual qualities, eight to auditory, six to taste and smell, and five to the rest. The points here emphasized are the interrelations of visual qualities, their dependence upon the stimulus and receptor, the work of Henning and Parker on smell, and Boring and Murray on bodily sensations. One is rather puzzled to know why the alleged protopathic and epicritic divisions of cutaneous quality were not mentioned, including Boring's masterful refutation, also Titchener's touch pyramid. Cutaneous qualities are neglected in favor of the auditory, but, as it is, the recent dispute over pitch seems to have been overlooked.

In view of the highly technical and systematic viewpoint maintained for the most part throughout the book, and of the happy ref-

erences to the *Gestalt* movement and allied researches, one can not help but wish that the problem of quality had received more attention as a systematic problem. The author's position with respect to the stimulus-error, later in the book, suggests that the meaning and perceptual nature of quality has never received adequate consideration. Instead of attacking this problem he gives us a host of highly integrated characteristics of sensation which, by implication, are elemental, though many of them are fortunately called "epithets." These pages so abound in adjectives surrounded by quotation marks that one wonders if the author is not writing a parable. The entire text is not free from this objection.

There next appears a brief account of sensimaginal and affective qualities followed by a classification of quantitative attributes. Extent is regarded as a perceptive overlay upon experience. In the reviewer's opinion we may anticipate shortly that the same admission will be made in regard to intensity, duration, and clearness, and that introspectionists generally will agree that never are they describing "experience itself" or any quality thereof in contrast to a perceptual overlay.

Then, after devoting several pages to the nervous system, Bentley presents at length what he regards as the organization of experience and the psychosomatic functions. He differentiates sharply between those forms of mental structure which are supposedly fixed by the stimulus or receptor and those which are fixed by central tendencies. Organization takes the form of primary and secondary incorporations. The first furnishes the foundation for perceptions and the second for ideas. Organized secondary incorporations break and under certain conditions are reformed. In this connection are to be found a few facts concerning the economy of memory, and here we are introduced to one of the fundamental laws of neural action: a bodily aptitude toward the completion of all functions when those functions are renewed (law of association).

External and central conditions together contribute to any total incorporation the property of attentional clearness.

We now pass from an inspection of component qualities and organization to a "functional description" of those performances of the psychosome in which mental and organic factors unite. The body contributes the vehicle and the energy. Mind contributes reference or meaning. Bentley does not give us a clear notion of function from a systematic viewpoint. By it is meant, however, a mode of operation, an accomplishment, of which there are four kinds. The first is apprehension, of which perception is an example. The keyword to perception is object. The author avoids the notion of psychological dimensions of space and advocates the view that, since

perception is bodily as well as mental, space is merely something to consider empirically. The problem is to determine the conditions of apprehension.

Memory is the second apprehensive function. It is a species of perception in which secondary incorporations carry the familiarity and identification.

The second group of psychosomatic functions is the executive, consisting of action and emotion. Determination is the key-word to action. The function is completed by bodily movement. There are no new elements involved on the mental side. Bentley thus falls into the terminology of motor psychology, although he has already warned us against the extravagances of such a viewpoint. Does he intend to draw a meaningless distinction between the mental and bodily contributions to the function? If the function really begins, as he tells us it does, with apprehension of a problem and ends in movement, one would suppose that there is a relationship between these two stages other than that of mere sequence. Here Bentley's system suffers for the want of behavioristic principles. We are warned against the assumption that kinesthesis is ever present, and now it comes in (this is not the first time) by way of a back door. True that our author protests against the notions of ideo-motor action and dynamogenesis. It is the body which carries on the functional activity. But what about mind which is efficacious without a *modus operandi?* Is it not inconsistent to speak of determination one moment and in the next leave the matter merely as an empirical fact of sequence? In short, the author's concept of a mind-body unity is an empty construction of questionable value. It interprets nothing. There is no definite, systematic concept behind his notion of unity and no systematic ideas lead from it. The mechanism of a mind-body action is not worked out. Because this view attempts to dodge all implications simply by ignoring them it assumes the burden of them all. It is subject, therefore, to all of the criticisms due an out and out parallelism with the additional defect that it is far less specific.

Especially does all of this become evident in his treatment of choosing. The progression of events in choosing is a sequence in which mind and its meaning and the nervous system with its "nice disposal and transformation of energy unite in a single operation" (289). We are not told, in a genuinely descriptive fashion, how choices are made.

Emotions are executive functions in which the action is modified in its determination and resolution. Apprehension is always involved and provides "scenery" for the emotional enactment. Bodily

reactions are included in the function evidently as contributions from the physical side. The key-word to emotion is predicament.

The third group of psychosomatic functions is the comprehensive, of which only one mode is considered—understanding. "Topic" is the key-word. Language and abstraction are here important.

Finally we have the elaborative function—thinking proper. Superficial analysis reduces thinking to verbal, visual, and other symbols. *Bewusstseinslagen*, translated as postures, are regarded as important elements in thinking, representing "gauges" of the state and temper of the organism. Because of a meagerness in his own introspections (he does not rely upon introspections from the literature) and a difficulty with the problem of meaning, he struggles bravely but unsuccessfully through forty pages. As if in apologetic fashion he reminds the reader that the reason why the mental qualities seem so inadequate is to be found, among other things, in the fact that thinking is a function prepared for by the nervous system. "Our quest for mental material yields insignificant results which, taken one by one, have no resemblance to the significance of the elaborated meaning" (347). Then he takes shelter behind the stimulus-error! Much in thinking is "meaning," not mind! Then, too, there is another sort of meaning: that with which "physiological processes inform our action." And so the vital part of thinking has been relegated once more to logic, epistemology, and physiology! We must grant Bentley the handicap of not having adequate experimental literature by means of which to handle the problem of thinking, but we can hardly excuse his neglect of the studies that are available, especially the investigations carried out a few years ago at the Clark Laboratory.

We now find a long chapter devoted to the limits of function. A brief history of the problems involved in handling the psychophysical methods leads to the conclusion that it is not a mental process which is measured, but the functional limit of a psychosomatic performance. Here Bentley makes systematic use, in principle, of the Cattell-Urban side of a long and familiar controversy. We escape the stimulus-error because no "processes" are measured. Measurement of function is the only possible kind. Such errors as do occur are traceable to uncontrolled factors as in any science. As for the test-methods, one must distinguish their technological from their psychological significance. Without question this is the best chapter in the book. It contains (as we would like to say of the other chapters) an adequate amount of historical background to make the problems stand out clearly. Here also is to be found the most useful systematic idea of the entire text, namely, that measurement deals with function and not with content.

The last part of the book is devoted to chapters on the socialization and genetic development of the psychosome. The author goes into the means and conditions of socialization and classifies social groups and the outcomes of socialization from a psychological point of view. The development of the individual is treated under the headings: integration of qualities, the fusion of perception and action, habituation and learning. Considerable reliance is placed upon the conditioned reflex and findings of the *Gestalt* School. Racial development follows the principles of genetic continuity and the uniform conjoining of mental and bodily factors. According to these principles we have a formula for use in comparing human with animal functions.

There are many ideas and principles set forth in this book which are attractive and well taken. In its various deviations from the beaten path it constitutes a decided step in advance in systematization. But in the reviewer's opinion the author fails to make adequate use of these deviations. While his caution leaves nothing in the way of carrying out his interpretations to their logical conclusions, it has led to the neglect of many useful facts. The limitation of "mind" to "experience" (sensation, sensimage, and feeling) is a bold conception, but unfortunate both in the fact of this limitation and in the use of the word "experience." On the other hand, quantitative problems are for once assigned a definite, consistent, and logical place in a psychological system. The notion of psychosomatic function makes this possible.

Other attractive features of the book are the author's consistent avoidance of philosophical discussions, his frequent notices of recent literature, his stand against the sensory threshold, against psychological dimensions of space, against phenomenology, the importance ascribed to the so-called "surrogates" in perception, his footnote on attention (177), the systematic treatment of organization in mental life (although the separation of organization from perception is confusing), his definition of memory, his recognition of the cognitive side and his classification of the emotions, and his concept of "modes" of performance. All of these hang well together and are of far-reaching importance.

On the surface he has succeeded admirably in avoiding mentalism, structuralism, subjectivism, and other "isms" in psychological theory. But, after all, he has not succeeded in his purpose to clear himself from an artificial psychology of consciousness. There seem to be three main reasons for this: First, he assigns to meaning a place of utmost importance in his discussion—another excellent feature as far as it goes—but at the same time he has attempted to envisage it as outside of his system. As a consequence he is actually

tied down to a left-handed mentalism which he is constantly, but abortively, seeking to avoid. Meaning is ever a source of annoyance to him. Note the following statements (condensed): Mind is full of short cuts to meaning (148); meaning trains are outside of mental organization (151); meaning is not quality, but borne by it (148); there is meaning only when mental factors are included (234); doubleness (in stereoscopic vision) is meaning, not mind (229); we literally see softness and weight, and a color may mean coldness (240) (the problem of synæsthesia is not mentioned!); a symbol is a meaning of a meaning (342); analysis of meaning never leads to mental products! (354); and meaning is object regarded factually (338). In any event it sustains only a functional relationship to the organism. It is difficult to make out just what is "meant" by this. Thus the entire system takes on a vagueness, uncertainty, and an appearance of inconsistency. This is unfortunate, and unintended by the author; but one can expect little else in a discussion which is constantly referring to meaning, at the same time denying it as a psychological problem. As a consequence, we can not reconcile the author's position with the conventional context theory, with facts which have developed in regard to the dependence of meaning upon kinesthesis, or with the author's own psychology of perception.

Second, the author is handicapped by the lack of a biological attitude. The psychosome is essentially a neuro-muscular organism. The two concrete vocabularies and sets of facts emphasized thus far in the history of psychology have pertained to consciousness (psychological) on the one hand and to the neuro-muscular organism (biological) on the other. Bentley has not combined the two. He has attempted to find a position on the side-lines, and as a consequence he has been unable to draw adequately from either set.

Third, the author has evidently misconceived the structure-function problem. He begins in the conventional way with structure. Is there a valid reason for setting aside image, sensation, and feeling as mental processes, and beginning with perception as psychosomatic function? Function is never built upon structure, but *with* it; the two form a logical dualism from beginning to end. True that one may tell us first, for practical reasons, what the descriptive units in a particular system will be; but Bentley went further and made an artificial, systematic use of these units in restricting mind to them. The logical outcome of his system is actually to dispense with the concept of mind altogether. The simplest experiential items should have been psychosomatic to make his system consistent. Consequently, the reader obtains a confused idea of what the whole book is about.

The author's fear of dynamism is another evidence of his con-

fused notion of the structure-function problem. The concepts of change, shift, train, *et cetera,* are inadequate, systematically, without the notion of motion or energy, otherwise science is left with no interpretative principle and a meaningless statistics of statics. Dynamism is dangerous only when it parades in structural clothes (animism), and structuralism is dangerous when content is read into function (*vis a tergo*). These two errors are historically and logically distinct. We venture the opinion that no functional psychology will be successful from a systematic viewpoint until it admits of a dynamic vehicle wholeheartedly enough to couch its interpretations of observed fact throughout in terms of that vehicle. In his indirect adherence to a parallelism Bentley has not done this.

Finally we read: "To set it [meaning] down—as mental is—to confuse existence with function" (354). Thus Bentley regards content as existence instead of making it *mode* of existence. The clarity of an entire system, especially the treatment of meaning, hinges upon this distinction. Logically, function is existence. (Psychology might profit from the viewpoint of the physicist in this regard.) The "matter" of psychology (constituents of experience) is merely the form. (A misplaced confidence in "phenomenology" and "the given" is responsible for so much confusion here.) As a consequence of all this Bentley has divorced meaning from the mental, whereas it is the very existence of the mental. It would seem that the only way in which a psychological system can effectively handle the problem of meaning is to begin and end with it.

Upon the logic of the structure-function problem depends also the manner in which to relate mental and bodily factors. As they are, the author's numerous references to the central nervous system are systematically vague and of questionable value. We are told again and again of its vast importance, now with certainty and now with apparent misgivings, but in not a single instance are we given any tangible clue of the reason for dragging it in, nor, from his use of the central nervous system can we see that he derives any real aid in explaining the psychosomatic functions. As a rule "central processes" are blamed for problems which the author fails to solve by other means. Like the subconscious, "central processes" constitute so vague and undemonstrable a background that they can be used for almost anything. And so they bear the brunt of the author's interpretation of perception, attention, action, and thinking. This, when we were promised at the outset that there would be no appeal to dogma! In the absence of material drawn from the literature on reflex action, concepts of the reflex arc and of proprioceptive stimulation, Bentley's "psychosome" is not only an empty, logical construct, but a creature far short of the empirical fact.

In general the author's style shows caution and deliberation, but it is wandering, heavy, and formal. In many places it is ambiguous. It varies between the extremes of simplicity and technicality. With its constant reliance upon figures of speech, analogies, adjectives surrounded by quotation marks, and references to poetry it becomes impressionistic rather than direct and concrete. Repeatedly one is led toward a climax which is lost in a maze of epithets and circumlocutions. Throughout it is more logical than psychological. We can not genuinely improve upon the reflective psychology of the past by substituting for it a new type of the same order, stressing abstractions and artifacts (tasks, occasions, predicaments, topics, incorporations, solutions, indicatory transfers, aspects, and the like). But when we look upon *The Field of Psychology* as an attempt to approach the observed situation from a functional viewpoint, we can not help but feel that the effort will bear fruit in abundance. It represents the transition now going on in psychological thinking, and it is a powerful blow to conventional systems. The book is therefore a valuable one, interesting to all who have systematic leanings, and for certain advanced classes, already prepared with an appropriate background, it should prove highly suggestive and stimulating.

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The Will-Temperament and Its Testing. JUNE E. DOWNEY. Yonkers: World Book Company. 1923. 339 pp.

From tea leaves to planets man has sought for the answer to the supersphinxian riddle of personality and has called in everything from imagination to mathematics to aid him in his search. The pseudo-science of graphology is one of these hunting grounds, one of which has for some time served as a field of scientific investigation for Dr. June Downey. Out of her researches in this field grew the *Will-Temperament Test* which was published three years ago; a form adapted to giving it to groups soon followed. The present volume sets forth in very readable detail the nature of the test, its claims, and its criticisms.

The test endeavors to tap the nervous energy at the disposal of the individual and discover traits by measuring the character of writing responses under different test conditions. One writes "United States of America" at top speed on a very short line to test "Coördination of Impulses"; in one's usual hand at top speed for "Speed of Movement"; as slowly as possible for "Motor Inhibition"; in a disguised hand for "Flexibility"; exactly like a copy for " Interest in Detail," *etc.*

Two questions arise. The first is, Why were these different re-

sponses given trait names? Miss Downey answers this explicitly on page 75 and again on page 113. This was to arouse interest. But this may be pardoned since she desires that this interest stimulate further investigation.

The second question relates to the danger of this course of action, a danger which Miss Downey occasionally loses sight of. For example, on page 98 she tells us that the individual of slight Flexibility can not have his armchair moved, or his meal time changed, can not take a different seat in church, and introduces no innovations. But no one of these things is a sure or even a fair indication of the existence of the others, least of all the ability to disguise one's handwriting! In other words, the amount of flexibility, or of speed of decision, or of confidence, or of any other "trait," an individual may exhibit is different in different situations, as recent investigations tend to show. We can not assume trait consistency.

The book itself is written for the student of the subject, though the first three chapters, presenting a history of attempts to read and measure personality, are of interest to the general reader. The preliminary scientific work which preceded the publication of the test, the intercorrelations of different traits, the plan of the "will-profile," and the nature of the experimental work which may yet be done are all set forth in careful detail.

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NOTES AND NEWS

The April number of the *Monist* will be a special number containing the papers read at the Bicentenary Commemoration of Immanuel Kant held at Northwestern University, December 4 and 5, 1924. These articles will be supplemented by interesting illustrations showing portraits of Kant in youth and in maturity, pictures of his home, and of the memorial recently erected in Königsburg. Some numbers of this issue will be bound in boards for class or library use.

The *Monist* invites members of the American Philosophical Association to contribute articles and make use of its pages for the encouragement and development of American philosophy.